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11 October 1954

MEMORANDUM FOR: THE RECORD

SUBJECT: Project Monitor on P-101B Communications System,
Infrared

1. Time and Place of Meeting: The meeting was at the [redacted] on 6 and 7 October 1954.

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2. Attendance: [redacted]

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3. Discussion: The discussion was divided into four main phases: Progress to Date, Power Sources, Search-Find, and Package Design.

a. Progress to Date

Two breadboard equipments have been completed and given three operational field tests, two night tests and one day test. These tests were held at a range of $1\frac{1}{4}$ miles and were successful in that communication was established.

The breadboard equipment utilizes 8" diameter mirrors with circles of confusion somewhat larger than desirable. The following beamwidths are being used for communicating:

| | |
|--------------|---|
| transmitters | $1\frac{1}{4}^{\circ} \times 1/3^{\circ}$ |
| receivers | $1/3 \times 1/3^{\circ}$ and $2/3^{\circ} \times 2/3^{\circ}$ |

The breadboard equipment was demonstrated to us at an equivalent 6 mile ACW range in the [redacted] vacuum range. It was apparent that 6 miles ACW is the absolute maximum working range with the breadboards. It was felt that by optimizing amplifiers and optics this might be somewhat improved.

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b. Power Sources

It was decided by APD that all emphasis should be placed on a battery vibrator supply until a definite decision can be made on the status of the motor-generator. [redacted] was requested to obtain from [redacted] before the end of October some definite word on the

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possibilities of silencing the generator. If [] feels little or no chance of success exists, the whole motor-generator project will be stopped. If [] feels that the silencing can be successfully done, the project will be continued using a low quality gasoline engine in place of a kerosene-plus-additives-engine.

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APD requested that a foolproof and simple battery charger be built into the unit. This charger shall operate from 110 or 220 volts ac \pm 10% at 50-60 cps.

c. Search - Find Problems

The following procedure for starting communication has been decided upon:

A is the case officer in charge. He will be responsible for the necessary planning and will operate the station in friendly territory. B is a principal agent who is living in unfriendly territory adjacent to the border. He is able to contact A but has no means for transmitting large volumes of information without the I. R. system. B is able to approach points within 6 miles of the border without difficulty.

A obtains a map of the area (1:25,000 scale or better). From this map possible sites for line-of-sight communications are selected subject to being convenient for both A and B. An on-the-spot survey of these sites is made by A. The best site is selected and photographs are made of the unfriendly station from the friendly area. Both are located on the map as accurately as possible and B's station is marked on the photograph. All landmarks visible by day and by night are recorded on the map with their relation to the stations clearly shown. Copies of the map and photographs are given by A to B. B will in all probability visit his given station by day to familiarize himself with the area and A's location.

It is assumed that the I. R. equipment will have beamwidths comparable to those of the breadboards. The equipment will be equipped with two sights, an I. R. viewer for night use and a set of telescopic rifle sights for daytime use. Provision for widening the transmitter beams by a factor of 3 will be included, (defocusing of source). A standard military compass will be provided as an accessory.

Night Operation: A and B will turn on their transmitters (tone modulated) in the defocused condition and will aim them with the aid of compass and landmarks in the appropriate direction (45° azimuth $42\frac{1}{2}^{\circ}$ elevation). Each will then begin a systematic sweep (possibly aided by mechanical means) until they are able to detect the presence of each other's transmitters.

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As soon as detection occurs, centering will be accomplished by means of the viewer. The beams will then be narrowed and again aligned by viewer. Further alignment will be accomplished by maximizing the audio tone using the regular I. R. receiver. Communication can begin following this final alignment. It is estimated that 5 minutes will elapse between the time the transmitters are turned on and the time communication starts.

Daytime Operation: A procedure similar to that for night operation can be used in daylight. Initial alignment is accomplished by sighting at landmarks. Further alignment is accomplished by using the receiver and defocussed beam. Final alignment is accomplished with focussed beam. A fairly detailed signal plan will be required for daylight operation in order to properly synchronize A and B's operation.


If possible, the I. R. viewer will be used during daytime operation.

d. Package Design

The following items on the final package were specified:

- (1) Tripod legs about 2 feet long will be supplied with the equipment.
- (2) Telex Dynaset stethoscope headphones will be used
- (3) The equipment will be sealed watertight when closed and will be splashproof when open for use.

Further work on the package design was requested by 8 November.


TSS/APD

Distribution:

Orig. - P-101B ✓
1 - Chrono

AST/bb

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